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09/725,959	11/30/2000	Jong-Woo Shin	Q61266	8642

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EXAMINER

SHAPIRO, LEONID

ART UNIT	PAPER NUMBER
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2673

18

DATE MAILED: 03/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/725,959

Applicant(s)

SHIN ET AL.

Examiner

Leonid Shapiro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20 is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-5, 7-15 is/are rejected.
- 7) ☒ Claim(s) 3, 6 and 16-19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-2, 4-5, 7-9, 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornbeck (US Patent No. 6,323,982 B1) in view of Giebel et al. (US Patent No. 6,206,290 B1).

As to claim 1, Hornbeck teaches a micro-mirror device for an image display apparatus (See Col. 1, Lines 42-45), comprising: substrate (See Fig. 4, 5, item 304, in description See Col. 7, Line 34); a landing pad (bias/reset structure is equivalent to landing pad) provided on the substrate (See Fig. 4, item 312, in description See Col. 7, Line 44); a pair of base (address is equivalent to base) electrodes (See Figs. 4-5, item 310) provided on opposite sides of the landing pad (See Fig. 4, 5, item 310, in description See Col. 7, Lines 44-45); a pair of first posts (the torsion beam support posts equivalent to first posts) (See Fig. 4, 5, item 116), that protrude from an upper surface of the landing pad (bias/reset structure is equivalent to landing pad) (See Fig. 4, item 312, in description See Col. 7, Line 44), which are isolated from each other by the by a predetermined interval (See Fig. 4, 5, item 116, in description See from Col. 8, Line 64 to Col. 9, Line 3); a girder (torsion hinge yoke is equivalent to a girder) (See Fig. 4, 5, item 114) supported by the pair of the first posts (the torsion beam support posts equivalent to first posts) (See Fig. 4, 5, item 116), which is operative to pivot toward sides of the base (address is equivalent to base) electrodes (See Fig. 4, 5, items 310, 114, in description See Col. 7, Lines 53-

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54); a second post (mirror support spacer is equivalent to a second post) (See Fig. 4, 5, item 326, in description See Col. 9, Lines 32-33) protruding from an upper surface of the girder (torsion hinge yoke is equivalent to a girder) (See Fig. 4, 5, item 114); a mirror supported by the second post (mirror support spacer is equivalent to a second post) (See Fig. 4, 5, item 326, in description See Col. 9, Lines 32-33), which reflects incident light, and receives power via the landing pad (bias/reset structure is equivalent to landing pad) (See Fig. 4, 5, item 102, in description See Col. 7, Line 54).

Hornbeck does not show the mirror is pivoted toward the sides of the landing pad (bias/reset structure) by an electrostatic attraction between the pair of the base (address) electrodes and the mirror.

Giebel et al. teaches the mirror is pivoted toward the sides of the landing pad (bias/reset structure) by an electrostatic attraction between the pair of the base (address) electrodes and the mirror (See Fig. 2a-2b, 5 items 60,62,64,66,68, in description See Col. 4, Lines 3-38 and Col. 5, Lines 3-9).

It would have been obvious to the one ordinary skill in the art in the time of invention to use Giebel et al. approach in the Hornbeck apparatus in order to inexpensively fabricate an accurately controlled, moving optical component, such as a mirror (See in Giebel et al. description Col. 2, Lines 8-11) and “The packaged scan element is designed for wafer scale assembly, which **significantly reduced device cost**” (See Col. 5, Lines 43-45 in the Giebel reference).

As to claim 10, Hornbeck teaches an image display device with a plurality micro-mirror devices (See Fig. 3, item 100, in description See Col. 7, Lines 26-28), wherein each of the

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plurality of micro-mirror devices comprises: substrate (See Fig. 4, 5, item 304, in description See Col. 7, Line 34 a landing pad (bias/reset structure is equivalent to landing pad) provided on the substrate (See Fig. 4, item 312, in description See Col. 7, Line 44); a pair of base (address is equivalent to base) electrodes provided on opposite sides of the landing pad (See Fig. 4, 5, item 310, in description See Col. 7, Lines 44-45); a pair of first posts (the torsion beam support posts equivalent to first posts) (See Fig. 4, 5, item 116), that protrude from an upper surface of the landing pad (bias/reset structure is equivalent to landing pad) (See Fig. 4, item 312, in description See Col. 7, Line 44), which are isolated from each other by the by a predetermined interval (See Fig. 4, 5, item 116, in description See from Col. 8, Line 64 to Col. 9, Line 3); a girder (torsion hinge yoke is equivalent to a girder) (See Fig. 4, 5, item 114) supported by the pair of the first posts (the torsion beam support posts equivalent to first posts) (See Fig. 4, 5, item 116), which is operative to pivot toward sides of the base (address is equivalent to base) electrodes (See Fig. 4, 5, item 114, in description See Col. 7, Lines 53-54); a second post (mirror support spacer is equivalent to a second post) (See Fig. 4, 5, item 326, in description See Col. 9, Lines 32-33) protruding from an upper surface of the girder (torsion hinge yoke is equivalent to a girder) (See Fig. 4, 5, item 114); a mirror supported by the second post (mirror support spacer is equivalent to a second post) (See Fig. 4, 5, item 326, in description See Col. 9, Lines 32-33), which reflects incident light, and receives power via the landing pad (bias/reset structure is equivalent to landing pad) (See Fig. 4, 5, item 102, in description See Col. 7, Line 54).

Hornbeck does not show the mirror is pivoted toward the sides of the landing pad (bias/reset structure) by an electrostatic attraction between the pair of the base (address) electrodes and the mirror.

Giebel et al. teaches how to drive an actuator in parallel to a substrate (See Fig. 2a-2b, 5 items 60,62,64,66,68, in description See Col. 4, Lines 3-38 and Col. 5, Lines 3-9).

It would have been obvious to the one ordinary skill in the art in the time of invention to use Giebel et al. approach in the Hornbeck apparatus in order to inexpensively fabricate an accurately controlled, moving optical component, such as a mirror (See in Giebel et al. description Col. 2, Lines 8-11) and “The packaged scan element is designed for wafer scale assembly, which **significantly reduced device cost**” (See Col. 5, Lines 43-45 in the Giebel reference). An actuator of Giebel et al. would be implemented to mount the mirror in the Hornbeck apparatus.

As to claim 11, Hornbeck teaches the plurality of micro-mirror devices are arrayed to form a two-dimensional structure (See Fig. 3, items 100, 102, in description See Col. 7, lines 25-29).

As to claim 12, Hornbeck teaches control by the electrostatic attraction between the pair of base (address is equivalent to base) electrodes (See Figs. 4-5, item 310) and the mirror (See in description Col. 2, lines 52-58).

As to claim 13, Hornbeck teaches about a method of reflecting light using a micro-mirror device in an image display apparatus (See Col. 1, Lines 42-45), comprising: supplying a driving voltage to at least one of the pair of base (address is equivalent to base) electrodes of the micro-mirror device (See Fig 4-5, item 310, Col. 7, Lines 44-45), and altering the driving voltage which

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is supplied to the at least one of the pair of base (address is equivalent to base) electrodes (See Fig 4-5, item 310, Col. 7, Lines 44-45) so that a reflection angle of light incident upon the mirror is controlled (See Fig.3, item100, in description See Col. 2, Lines 32-64).

Hornbeck does not show how to create an electrostatic attraction between the at least one of the pair of the base electrodes and a mirror, wherein the mirror is pivotally supported by a pair of spring members so as to be pivoted around an axis formed in lengthwise direction of the pair of the base (address) electrodes such that one of the spring members is forced in a direction opposite a direction of the other of the spring members when mirror is pivoted.

Giebel et al. teaches how to drive an actuator in parallel to a substrate (See Fig. 2a-2b, 5 items 60,62,64,66,68, in description See Col. 4, Lines 3-38 and Col. 5, Lines 3-9).

It would have been obvious to the one ordinary skill in the art in the time of invention to use Giebel et al. approach in the Hornbeck apparatus to create an electrostatic attraction between the at least one of the pair of the base electrodes and a mirror, wherein the mirror is pivotally supported by a pair of spring members so as to be pivoted around an axis formed in lengthwise direction of the pair of the base (address) electrodes such that one of the spring members is forced in a direction opposite a direction of the other of the spring members when mirror is pivoted in order to inexpensively fabricate an accurately controlled, moving optical component, such as a mirror (See Giebel et al. in description Col. 2, Lines 8-11) and “The packaged scan element is designed for wafer scale assembly, which **significantly reduced device cost**” (See Col. 5, Lines 43-45 in the Giebel reference).

As to claim 2, Hornbeck teaches each of a pair of base (address is equivalent to base) electrodes (See Figs. 4-5, item 310) has a protruding portion protruding inward to widen an area

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that faces the girder (torsion hinge yoke is equivalent to a girder) (See Figs. 3-4, items 114, 310, 312, Col. 7, Lines 40-44).

Hornbeck does not show a longest side of the base electrode is parallel to a side of the mirror.

Giebel et al. teaches how to drive an actuator in parallel to a substrate (See Fig. 2a-2b, 5 items 60, 62, 64, 66, 68, in description See Col. 4, Lines 3-38 and Col. 5, Lines 3-9).

It would have been obvious to the one ordinary skill in the art in the time of invention to use actuator in parallel to a substrate as shown by Giebel et al. in the Hornbeck apparatus in order to inexpensively fabricate an accurately controlled, moving optical component, such as a mirror (See Giebel et al. in description Col. 2, Lines 8-11) and "The packaged scan element is designed for wafer scale assembly, which **significantly reduced device cost**" (See Col. 5, Lines 43-45 in the Giebel reference).

As to claim 4, Hornbeck teaches landing tips (spring is equivalent to landing tips) (See Fig. 4, item 128) protruding from opposite sides of the support plate (See Figs. 4-5, item 328), which contact landing pad (dielectric layer is equivalent to landing pad) (See Fig. 4, item 328) during pivoting (See Fig. 4, 5, items 128, 328, in description See Col. 7, Lines 62-64).

As to claim 5, Hornbeck teaches dielectric layer (See Fig. 4, item 328), which prevents adhesive contact with the pair of base (address is equivalent to base) electrodes (See Fig. 4, 5, items 328, 310, in description See Col. 7, Lines 62-64).

As to claim 7, Hornbeck teaches landing tips (spring is equivalent to landing tips) (See Fig. 4, item 128) protruding from opposite sides of the support plate (See Figs. 4-5, item 328),



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which contact landing pad (dielectric layer) during pivoting (See Fig. 4, 5, items 128, 328, in description See Col. 7, Lines 62-64).

As to claim 8, Hornbeck teaches the pair of base (address is equivalent to base) electrodes (See Figs. 4-5, item 310) with protruding portion protruding inward to widen area that faces the girder (torsion hinge yoke is equivalent to a girder) (See Fig. 4, 5, items 114, 310, in description See Col. 7, Lines 44-45).

As to claim 9, Hornbeck teaches the mirror pivoted around an axis that is parallel to lengthwise direction of the pair of base electrodes, the lengthwise direction being parallel to a side of the mirror (See Figs 3-4, items 102, 114, Col. 7, Lines 58-67).

As to claims 14-15, Giebel et al. teaches the pair of base (address is equivalent to base) electrodes (See Figs. 4-5, item 310) oppose each other in a non-diagonal manner in respect to mirror (See Fig. 5, items 66,68, in description See Col. 5, Lines 3-10)

### ***Response to Amendment***

2. Applicant's arguments filed on 01-02-04 have been fully considered but they are not persuasive.

In response to applicant's argument on page 11, 2<sup>nd</sup> and 3<sup>rd</sup> paragraphs that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347,

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21 USPQ2d 1941 (Fed. Cir. 1992). In this case, one skilled in the art will recognize the benefits of using Giebel et al. in the Hornbeck apparatus and overcome the difficulties in pivoting mirror towards sides of the landing pad to reduce cost.

In response to applicant's argument on page 11, last paragraph and page 12, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs "there is no disclosed connection between the reduced cost and the manner in which the mirror pivots in Giebel", the examiner would like to point out that cost reduction will be connected to the simplicity of Giebel approach, which will require less fabrication steps compare to Hornbeck pivoting toward corners. Thus, one skilled in the art will recognize complexity and number of parts of Hornbeck approach versus Giebel et al. approach by comparing Fig. 4 in Hornbeck reference to Fig. 2a in Giebel et al. reference and Figs. 4-5 of the Application.

In response to applicant's argument on page 13, 2nd paragraph in relation to claims 14-15, Applicant's stated that ground of rejection of independent claim 1, relies on the base electrodes of Hornbeck, and Giebel et al. is relied on the of the rotating a mirror toward a side of a landing pad. However, one skilled in the art will recognize that that Hornbeck mirrors will be replaced by Giebel et al. mirrors in non-diagonal manner as per rejection of independent claim 1.

***Allowable Subject Matter***

3. Claim 20 is allowed.
4. Claims 3, 6, 16-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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4. Relative to claims 3, 6, the major difference between the teaching of the prior art of record (US Patent No. 6,323,982, Hornbeck and US Patent No. 6,206,209, Giebel et al.) and the instant invention is that the said prior art **does not teach** a support plate having connections that protrude from sides of the support plate, and a pair of springs.

Claim 20 is original claim 3 rewritten in independent form.

Relative to claims 16, 18 the major difference between the teaching of the prior art of record (US Patent No. 6,323,982, Hornbeck and US Patent No. 6,206,209, Giebel et al.) and the instant invention is that the said prior art **does not teach** the girder includes landing tips which protrude from sides of the girder and contact the landing pad when the mirror is pivoted.

Relative to claims 17,19, the major difference between the teaching of the prior art of record (US Patent No. 6,323,982, Hornbeck and US Patent No. 6,206,209, Giebel et al.) and the instant invention is that the said prior art **does not teach** girder includes a pair of spring members, and mirror has an axis of rotation which is perpendicular to a lengthwise direction of pair of spring members, wherein the pair of spring members respectively connect the girder to the pair of the first posts.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Telephone inquire***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 703-305-5661. The examiner can normally be reached on 8 a.m. to 5 p.m..

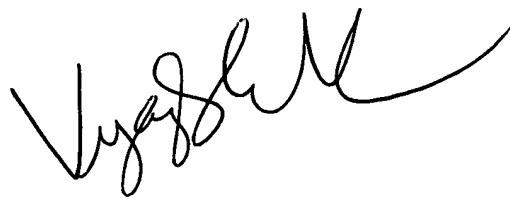
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 703-305-4938. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Vijay Shankar', written in a cursive style.

**VIJAY SHANKAR  
PRIMARY EXAMINER**